

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the above-referenced application.

Listing of Claims:

1. (Previously presented) Internal combustion engine system, comprising:

an internal combustion engine operating on at least one of ethanol, methanol, natural gas and propane, the engine having a compression ratio in the range of 11-16; and means for introducing into the engine fuel/air mixtures including an amount of hydrogen to substantially eliminate misfire at a first equivalence ratio in the range of 0.4 – 0.7 when the engine is operating below a selected torque or power level and introducing into the engine fuel/air mixtures in a second equivalence ratio range wherein the second equivalence ratio is greater than the first equivalence ratio when the engine is operated above the selected torque or power level, the second equivalence ratio being sufficiently low at all times to prevent knock and further including a knock sensor to detect knock in the engine.

2. (Previously presented) Internal combustion engine system, comprising:

an internal combustion engine operating on at least one of ethanol, methanol, natural gas and propane, the engine having a compression ratio in the range of 11-16; means for introducing into the engine EGR along with a stoichiometric fuel/air mixture including hydrogen sufficient to prevent misfire and wherein the amount of EGR is always sufficient to prevent knock.

3. (Cancelled)

4. (Currently amended) [[The]] An internal combustion engine system of claim 3, comprising:

an internal combustion engine, said engine having a compression ratio in the range of approximately 11 to 16;

means for inhomogeneously injecting hydrogen into a cylinder of the engine, wherein the injection of hydrogen is stratified such that a concentration of hydrogen injected in a region close to a spark plug is larger than at any other region within said cylinder; and

~~further comprising~~ means for introducing EGR into the engine.

5. (Currently amended) The engine system of claim [[3]] 4, further comprising means for increasing turbulence in said engine.

6. (Currently amended) [[The]] An internal combustion engine system of claim 3, comprising:

an internal combustion engine, said engine having a compression ratio in the range of approximately 11 to 16;

means for inhomogeneously injecting hydrogen into a cylinder of the engine, wherein the injection of hydrogen is stratified such that a concentration of hydrogen injected in a region close to a spark plug is larger than at any other region within said cylinder; and

~~further comprising~~ a knock sensor that detects knock.

7. (Currently amended) ~~[[The]]~~ An internal combustion engine system of claim 3, comprising:

an internal combustion engine, said engine having a compression ratio in the range of approximately 11 to 16;

means for inhomogeneously injecting hydrogen into a cylinder of the engine, wherein the injection of hydrogen is stratified such that a concentration of hydrogen injected in a region close to a spark plug is larger than at any other region within said cylinder, wherein said means for inhomogeneously injecting hydrogen varies hydrogen injection such that a misfire does not occur as an equivalence ratio increases.

8. (New) An internal combustion engine system, comprising:

an internal combustion engine, said engine having a compression ratio in the range of approximately 11 to 16;

at least one valve that introduces EGR into said internal combustion engine along with a stoichiometric fuel/air mixture including hydrogen sufficient to prevent misfire and wherein the amount of EGR is sufficient to prevent knock.

9. (New) The system of claim 8, further comprising:

at least one inlet that injects hydrogen inhomogeneously into a cylinder of the engine, wherein concentrations of hydrogen are stratified in the cylinder.

10. (New) The system of claim 8, further comprising:

at least one turbulence inducing element that generates turbulence in said engine.

11. (New) The system of claim 8, wherein said at least one valve introduces into the engine a first fuel/air mixture that includes an amount of hydrogen to substantially eliminate misfire at a first equivalence ratio when the engine is operating below a selected torque or power level and introduces into the engine a second fuel/air mixture in a second equivalence ratio when the engine is operated above the selected torque or power level, wherein the second equivalence ratio is greater than the first equivalence ratio.
12. (New) The system of claim 11, wherein said first equivalence ratio is in a range of 0.4 to 0.7.
13. (New) A method for controlling an internal combustion engine, comprising:
operating an internal combustion engine having a compression ratio in the range of 11 to 16;
introducing EGR into said internal combustion engine along with a stoichiometric fuel/air mixture including hydrogen sufficient to prevent misfire and wherein the amount of EGR is sufficient to prevent knock.
14. (New) The method of claim 13, further comprising:
injecting hydrogen into a cylinder of the engine, wherein the injection of hydrogen is inhomogenous and generates stratified concentrations of hydrogen in said cylinder.

15. (New) The method of claim 13, further comprising:

generating turbulence in a cylinder of said engine.

16. (New) The method of claim 13, further comprising:

introducing into the engine a first fuel/air mixture that includes an amount of hydrogen to substantially eliminate misfire at a first equivalence ratio when the engine is operating below a selected torque or power level and introduces into the engine a second fuel/air mixture in a second equivalence ratio when the engine is operated above the selected torque or power level, wherein the second equivalence ratio is greater than the first equivalence ratio.

17. (New) The method of claim 13, wherein said first equivalence ratio is in a range of 0.4 to 0.7.